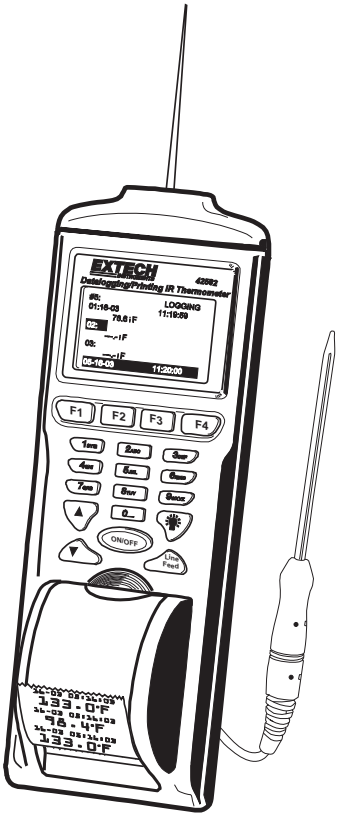
EXTECH INSTRUMENTS

User's Guide

IR Thermometer
Printer / Datalogger
with External Contact Probe

Model 42582



Introduction

Congratulations on your purchase of the Extech 42580 IR Thermometer Printer-Datalogger. This device measures temperature with the non-contact IR sensor and the external contact probe. The built-in Datalogger feature stores up to 12,000 readings. The readings can be displayed directly on the meter or can be for transferred to a PC. The Printer provides a hard copy of stored readings. Careful use of this meter will provide years of reliable service.

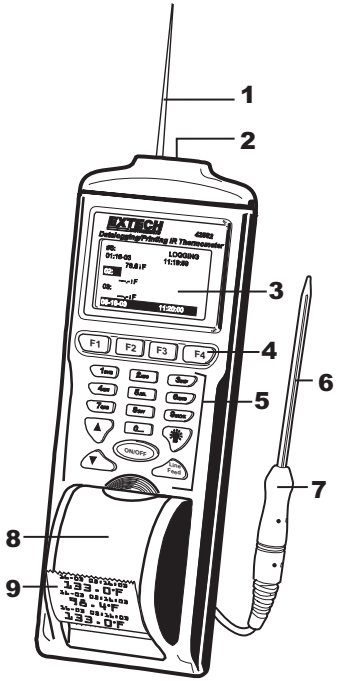
Safety

- Use caution when the laser pointer beam is on
- Do not point the beam toward anyone's eye or allow the beam to strike the eye from a reflective surface
- Do not use the laser near explosive gases or in other potentially explosive areas

Description

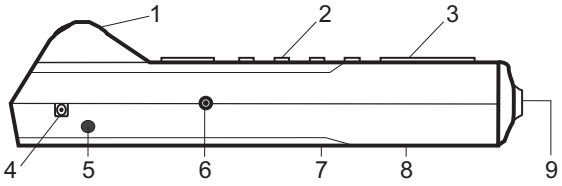
Meter Front Panel

1. Laser pointer beam
2. Non-contact temperature sensor
3. LCD Display
4. Function Softkeys
5. Keypad
6. External Contact Probe
7. Probe Handle
8. Paper compartment
9. Printer paper



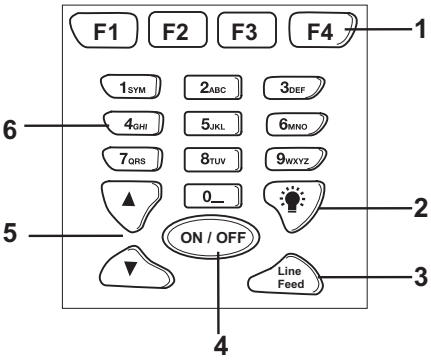
Meter Side View

1. Printer
2. Keypad
3. LCD Display
4. AC Adapter
5. RS-232c TTL jack
6. External temperature probe input jack
7. Battery compartment
8. Tripod mount
9. IR sensor and laser pointer source



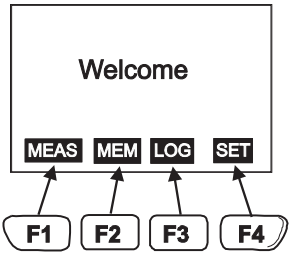
Meter Keypad

1. Function softkeys F1 – F4
2. LCD backlight key
3. Printer paper advance
4. Power button and measurement button
5. UP-DOWN arrow keys
6. Alpha-numeric keypad



Operation

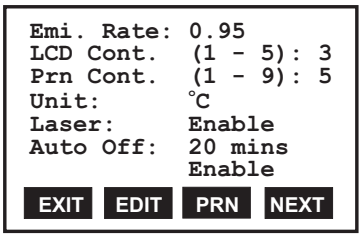
Press the ON/OFF button to power the meter. The WELCOME screen will appear along with four softkey selections (F1 through F4):



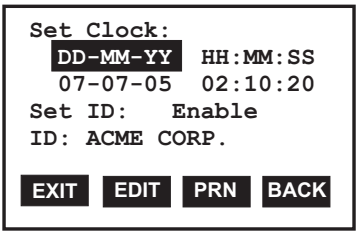
Setup

Two setup screens provide access to the Emissivity, LCD Contrast, Printer Contrast, Temperature Units, Laser Pointer ON/OFF, Auto Power OFF, Clock, and user ID.

1. Press the **F4** **SET** softkey from the WELCOME screen to access the first setup screen. See below.
2. Press **F4** **NEXT** to access the second setup screen from the first setup screen. Press Back to return to setup screen 1.



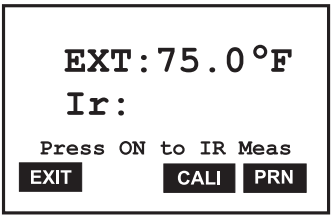
MAIN SETUP SCREEN 1



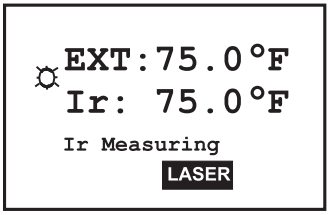
MAIN SETUP SCREEN 2

3. Press the ▲or▼ key to move the 1 cursor to the desired position.
4. The programmable parameters are as follows:
   - Emi. Rate: Adjust the emissivity (0.0 to 1.0) using the numeric keypad. Press **F4** **ENTER** when done.
   - LCD Cont: Adjust the LCD contrast (1-5) using the numeric keypad. Press **F4** **ENTER** when done.
   - Prn Cont: Adjust the print contrast (1-9) using the numeric keypad. Press **F4** **ENTER** when done.
   - Unit: Select temperature units (°C or °F) using the **F2** button.
   - Laser: Enable/Disable the laser pointer using the **F2** button
   - Auto Power OFF: Adjust from 1 to 20 minutes using the numeric keypad. Enable/Disable with the **F2** **EDIT** key. Press **F4** **ENTER** when done.
   - Date: Select date format MM: DD:YY, DD:MM:YY or YY:MM:DD using the **F2** **EDIT** key.
   - Set Clock: Press **F2** **EDIT** to begin editing the month, day, year, hour, minute, and second. Use the **ENTER** key to move from digit to digit. Use the numeric keys to change the number. Press **F4** **ENTER** when done.
   - SET ID: Enable/Disable the ID feature using the **F2** **EDIT** key.
   - ID: Press **F2** **EDIT** to begin entering a custom ID. Use the alpha-numeric keys to create the ID. Press **F4** **ENTER** when done.
   - Press the **F1** **EXIT** softkey to exit setup mode.

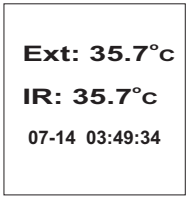
IR non-contact Measurements



1. Turn the instrument ON.
2. Press the **F1** **MEAS** softkey from the WELCOME screen to enter the measurement mode
3. Point the meter at the surface to be measured.
4. Press and hold the **ON** button to take a reading while pointing toward the target.
5. Press **F3** **LASER** during measurements to turn the laser pointer ON or OFF. The ☼ icon appears when the laser is on. Note that if the Laser is disabled in the SETUP mode, it will not light. Refer to the SETUP section to enable the Laser function..
6. Release the **ON** key to hold the measurement on the LCD when the measurement session is finished.



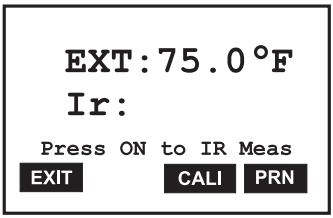
7. Press **F4** **PRN** to print the reading. Use the **LINE FEED** button to advance the paper.
8. Press **F1** **EXIT** to return to the WELCOME screen.



Sample Printout

Contact Measurements using the Remote Temperature Probe

1. Plug the external probe into the probe jack on the side of the meter.
2. Turn the instrument ON.
3. Press the **F1** **MEAS** softkey from the WELCOME screen to enter the measurement mode
4. Touch the probe to the surface under test.
5. Read the temperature on the LCD next to EXT (external)



6. To use the probe to find an emissivity setting for a particular surface, take an IR measurement and a probe measurement of the same surface, noting the readings. Then adjust the emissivity so that both the IR and the contact probe readings match. Now the emissivity is properly set for that particular surface. IR readings of that surface will be of the highest accuracy possible with this instrument.
7. Press **F4** **PRN** to print the reading. Use the **LINE FEED** button to advance the paper.
8. Press **F1** **EXIT** to return to the WELCOME screen.

Note: The **CALI** softkey is used to calibrate the external temperature probe to the meter. If this feature is accidentally entered, press and hold the **EXIT** softkey to exit the mode. A calibration procedure and probe calibration data is required to perform this procedure.

Manual Datalogging Mode

This instrument has two datalogging modes, **MEM** Manual Datalogging (99 records maximum) and **LOG** Automatic Datalogging (12,000 records maximum). Data saved in the Manual Datalogging mode can be recalled in the display, printed or transferred to a pc.

Manual Datalogging basics

To take a reading and store it in memory:

1. Press the **F2 MEM** softkey from the WELCOME screen.
2. Use the arrow buttons to select a memory location (1 through 99).
3. Press and hold the **ON** key to take a measurement as previously described. Release the **ON** key to end the test.
4. Press the **F4 SAVE** or the **F1 ABORT** key.

Manual Datalogging Display Screen 1

F1 EXIT: Press to return to the WELCOME screen

F2 MEAS Press to enter the measurement mode.

F3 EDIT: Press to begin customizing the header in the current memory location. Header customization is covered in a dedicated section later in this manual.

F4 NEXT Go to Manual Datalogger Screen 2.

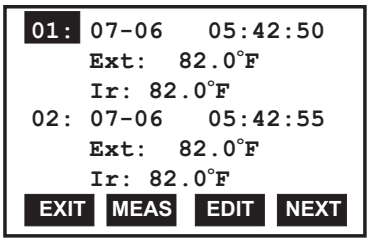
Manual Datalogging Display Screen 2

F1 EXIT: Press to return to the WELCOME screen

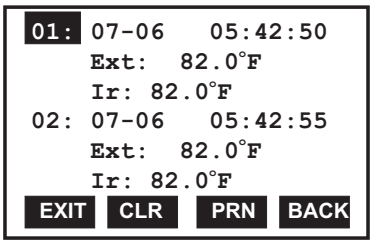
F2 CLR: Press for one second to erase the current memory location. Press and hold for longer than one second to erase all records currently held in memory.

F3 PRN: Press to print one or more readings. The instrument will prompt the user for a start and end memory point.

F3 BACK: Go to Manual Datalogger screen 1.



MANUAL DATALOG SCREEN 1



MANUAL DATALOG SCREEN 2

Viewing Stored Readings

1. From the WECLOME screen, press the **F2** **MEM** softkey
2. Use the **Arrow keys** to scroll through the memory locations and view the stored data.
3. Press the **F1** **EXIT** softkey to return to the WELCOME screen.

Printing Stored Data

1. Press **F2** **MEM** from WELCOME screen to proceed to Manual Datalogger screen 1.
2. Press **F4** **NEXT** to proceed to Manual Datalogger screen 2.
3. Use the **Arrow keys** to scroll to a memory location
4. Use the **F3** **PRN** softkey to print a data record.

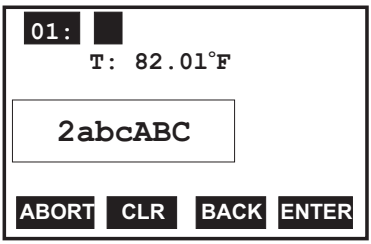
Erasing Data

1. Press **F2** **MEM** from the WELCOME screen to go to Manual Datalogger screen 1.
2. Press **F4** **NEXT** to proceed to Manual Datalogger screen 2.
3. Use the **Arrow keys** to scroll to a memory location.
4. Momentarily press the **F2** **CLR** softkey to erase the selected memory location.
5. Press and hold **F2** **CLR** to erase all readings in the Manual datalogger. Answer YES when prompted to erase ALL recorded readings. Press NO to abort.
6. Press **F1** **EXIT** to return to the WELCOME screen.

Customizing a Memory Location Header in the Manual Datalogging mode

The Header for each Memory location is the Date and Time stamp. To customize a header, follow the steps below:

1. Press **F2** **MEM** from the WELCOME screen.
2. Use the **Arrow keys** to select a memory location.
3. Press **F3** **EDIT** to begin editing.
4. Use the **Arrow keys** to step forward and backward in the header line (characters will not be erased)
5. Use the **F3** **BACK** softkey to step backward (erasing characters while stepping).
6. Use the **Alphanumeric keypad** to compose a header. For example, press the '2' key and a window with the characters related to the '2' key will appear (namely, 2abcABC as shown in the diagram). Then use the '2' key again to scroll through the character list. When the desired character is highlighted the meter will automatically place that character in the header.
7. The **F2** **CLR** softkey is used to erase the header.
8. The **F4** **ENTER** softkey is used to save the header.



HEADER EDITING

Automatic Datalogging Mode

In the **LOG** Automatic Datalogging mode the Model 42580 can automatically measure and store 12,000 readings at a programmed sample rate. Data saved in the Automatic Datalogging mode can be recalled in the display, printed or transferred to a PC.

Press the **F3 LOG** softkey from the WELCOME display to access LOG screens 1 and 2:

Log Screen 1

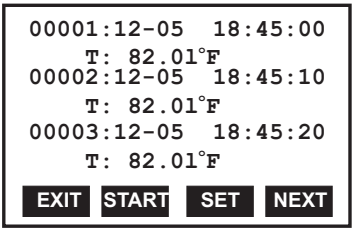
Press **F3 LOG** from the WELCOME screen to access LOG SCREEN 1.

F1 EXIT: Return to the WELCOME screen

F2 START: Begin automatic Datalogging at the pre-set sampling interval. Datalogging will begin at the date/ time programmed in the SETUP mode.

F3 SET: Setup mode.

F4 NEXT: Advances to LOG SCREEN 2:



LOG SCREEN 1

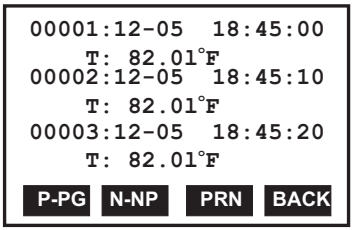
Log Screen 2

F1 LOG: Previous Page (previous 100 stored readings)

F2 N-PG: Next Page (next 100 stored readings)

F3 PRN: Print page

F4 BACK: Return to Log Screen 1



LOG SCREEN 2

Automatic Datalogging SETUP mode

From LOG SCREEN 1, press the **F3 SET** button to enter the configuration screen:

BEGIN: Date when datalogging will automatically begin

START: Time of day that datalogging will begin

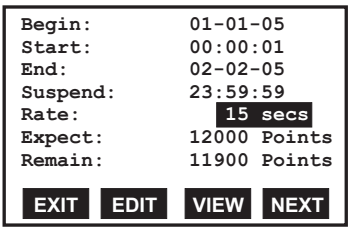
END: Date when datalogging will end

SUSPEND: Time of day that datalogging will stop each day

RATE: Sampling interval (time between recorded readings)

EXPECT: Total memory capacity (12,000)

REMAIN: Memory locations remaining



AUTO DATALOGGER SETUP 1

The two SETUP screens are almost identical; only the softkeys are different (see diagrams). The softkey functions for both SETUP screens are as follows:

EXIT: Returns to WELCOME screen.

EDIT: Select display field for editing.

VIEW: Calls up the stored readings log.

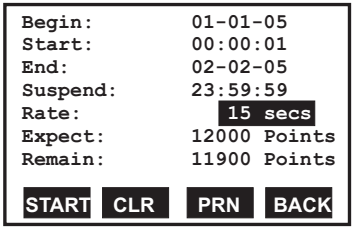
NEXT: Switches to SETUP screen 2.

START: Activates the datalogger

CLR: Erases all readings stores in the automatic datalogger memory.

PRN: Prints the datalogger memory record

BACK: Return to the SETUP screen 1.



AUTO DATALOGGER SETUP 2

To edit the fields in datalogger SETUP Screen1:

1. Use the up and down arrow keys to scroll through the parameters.
2. When a parameter is highlighted, use the **F2** **EDIT** softkey to open it for editing.
3. Use the alphanumeric keypad to edit the parameter.
4. Press the **F4** **ENTER** softkey to save changes. Press **F1** **ABORT** to cancel changes.
5. Press the **F1** **EXIT** softkey to return to the SETUP screen.

Recording Data in the Automatic Datalogging Mode

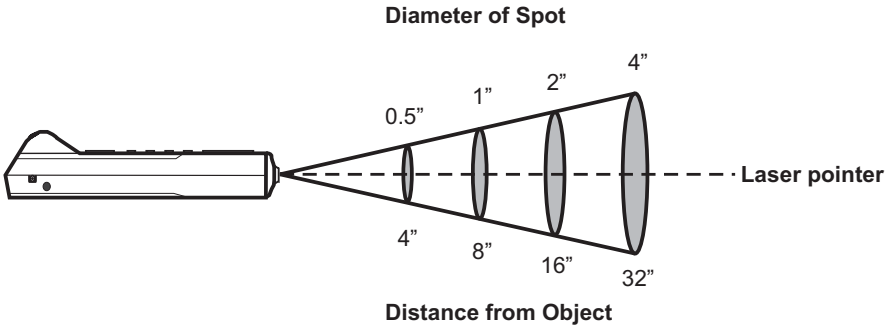
1. After configuring the datalogger using the SETUP screen as described previously, place the meter in position to take readings (a tripod mount is provided on the rear of the instrument for convenience).
2. Press **F3** **LOG** from the WELCOME screen and then press **F2** **START**.
3. Recording will begin on the date and time programmed at the BEGIN and START lines in the SETUP screen.
4. The Datalogger will record everyday from the START time to the SUSPEND time. The last day that datalogging will take place is the date programmed in the END line.
5. When the logging begins, the screen should indicate LOGGING...
6. If the screen does not indicate logging at the programmed start time, make sure the START key is pressed. Also check the section below entitled “Automatic Datalogging START and END date considerations” for troubleshooting.
7. To stop logging before the programmed SUSPEND time, press the **F1** **STOP** softkey.
8. While logging, view data records by pressing **F4** **VIEW**.
9. To print data from the list, press the **F1** **STOP**, the **F4** **NEXT** and then press the **F3** **PRN** softkey. Press the **F2** **YES** softkey when the PRINT? display appears.
10. To clear (erase) the recorded data, access the LOG mode from the WELCOME screen. Select SET, NEXT and then press and hold the CLR (clear) softkey until the display prompts for confirmation. Select YES to delete all records, or NO to abort the clearing process.

Automatic Datalogging START and END Date Considerations

1. If the START date is set to a date before the current date, the datalogger will start the moment the START softkey is pressed.
2. The datalogger will not start logging if the END date is earlier than the current date.

Field of View

The meter's field of view is 8:1, meaning that if the meter is 8 inches from the target, the diameter of the measurement spot (target) is 1 inch. Other distances and spot sizes are shown below in the field of view diagram. Refer to the chart printed on the meter also for more information.



IR Measurement Notes

1. The object under test should be larger than the spot (target) size (use the diagram above and the diagram printed on the side of the meter to calculate the spot size).
2. If the surface of the object under test is covered with frost, oil, grime, etc., clean before taking measurements.
3. If an object's surface is highly reflective apply masking tape or flat black paint before measuring.
4. The meter may not measure accurately through transparent surfaces such as glass.
5. Steam, dust, smoke, etc. will affect measurements.
6. The meter compensates for deviations in ambient temperature. It can, however, take up to 30 minutes for meter to adjust to extremely wide ambient temperature changes.
7. To find a hot spot, aim the meter outside the area of interest then scan across (in an up and down motion) until the hot spot is located.

Specifications

General Specifications

Display	Backlit Multi-function LCD
Over range indication	"-------" appears on the LCD
Printer	38mm Printer
PC Interface	RS-232C (TTL level)
Datalogger memory	12,000 readings
Low battery indication	Battery symbol appears on the LCD
Power supply	Four (4) 1.5V 'AA" batteries or optional 9V (1000mA) adapter
Operating current	500mA (printing), 6mA (IR active), 2mA (IR standby)
Auto Power OFF	Adjustable from 1 to 20 minutes
Operating Temperature	32 to 122°F (0 to 50°C)
Operating Humidity	90% Relative Humidity maximum
Dimensions/Weight	8.2 x 2.8 x 2.1" (208 x 70 x 53mm) / 9.2 oz. (260g) with battery

IR Measurement Specifications

IR Measurement ranges	-40 to 932°F (-40 to 500°C)
Accuracy:	-4 to 749ºF (-20 to 399°C); ±(2% of reading + 2 digit) or ±4ºF/2ºC (whichever is greater)
	-40 to -3ºF (-40 to -19°C); ±6ºF/3ºC
	750ºF to 932ºF (400 to 500°C); ±(4% of reading + 2 digit)
Resolution	0.1° for displays <212°, otherwise 1°
Repeatability	±1°
IR distance ratio	8:1
Response time	0.2 seconds
Emissivity	Adjustable from 0.3 to 1.0

External Probe Measurement Specifications

Probe Measurement range	-4 to 302°F (-20 to 150°C)
Accuracy:	-4 to 32ºF (-20 to 0°C); ±2.2ºF (1.2ºC)
	33 to 122ºF (1 to 50°C); ±1.4ºF (0.8ºC)
	123 to 212ºF (51 to 100°C); ±2.8ºF (1.6ºC)
	213 to 302ºF (101 to 150°C); ±5.4ºF (3ºC)
Resolution	0.1° for displays <212°, otherwise 1°

Maintenance

Cleaning

Wipe instrument with damp cloth as needed. Do not apply solvents or abrasives to the meter. Store in a cool dry place with the batteries removed.

Battery Replacement

When the batteries weaken, the LCD display will dim or go completely blank. To replace the batteries, open the rear battery compartment and insert four (4) new 1.5V 'AA' batteries with correct polarity position.

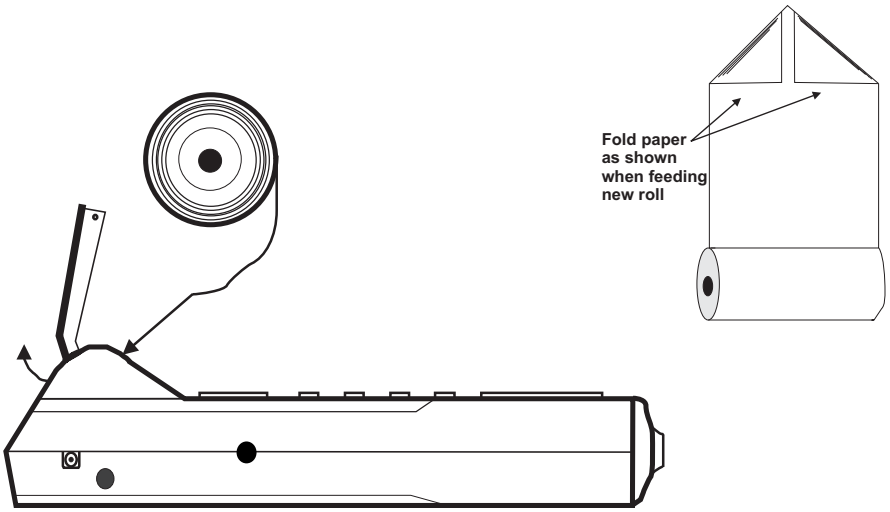
Paper roll replacement

When the paper roll is depleted, flip up the paper compartment lid, feed the paper through the paper slit, and feed the paper using the Line Feed button. Place the roll in the compartment and snap the compartment cover shut preventing the paper from falling out.

Hint: Folding the paper into a point allows the paper to "catch" a bit easier when feeding it through the slit (see diagram).

New paper rolls are available through Extech instruments and Extech distributors.

NOTE: Thermal paper prints on only one side. Ensure paper is positioned properly as shown in diagram.



Emissivity Considerations

The amount of IR energy emitted by an object is proportional to an object's temperature and its ability to emit energy. This ability is known as emissivity and is based upon the material of the object and its surface finish. Emissivity values range from 0.1 for a very reflective object to 1.00 for a flat black finish. The 42580 senses IR energy and calculates the temperature based upon the amount of IR energy it receives using a factory default emissivity setting of 0.95 (this setting covers 90% of applications).

Most organic materials and painted or oxidized surfaces have an emissivity factor of 0.95. Inaccurate readings will result from measuring shiny or polished metal surfaces which have emissivity factors other than 0.95. To compensate for polished/shiny surfaces, cover the surface with masking tape or flat black paint. Allow time, before measuring, for the tape to reach the same temperature as the material underneath it.

Emissivity Factors for Common Materials

Material under test	Emissivity	Material under test	Emissivity
Asphalt	0.90 to 0.98	Cloth (black)	0.98
Concrete	0.94	Skin (human)	0.98
Cement	0.96	Leather	0.75 to 0.80
Sand	0.90	Charcoal (powder)	0.96
Soil	0.92 to 0.96	Lacquer	0.80 to 0.95
Water	0.92 to 0.96	Lacquer (matt)	0.97
Ice	0.96 to 0.98	Rubber (black)	0.94
Snow	0.83	Plastic	0.85 to 0.95
Glass	0.90 to 0.95	Timber	0.90
Ceramic	0.90 to 0.94	Paper	0.70 to 0.94
Marble	0.94	Chromium Oxides	0.81
Plaster	0.80 to 0.90	Copper Oxides	0.78
Mortar	0.89 to 0.91	Iron Oxides	0.78 to 0.82
Brick	0.93 to 0.96	Textiles	0.90

Software

System Requirements

- Hardware Requirements: 486 PC or better with COM 1 and COM 2 Serial ports
- Operating System Compatibility: Windows™ 95/98/NT/2000/XP

Hardware Connection

The IR Thermometer connects to a PC with the supplied DB-9 to 3.5mm mini-plug (mono) interface cable. The DB-9 end connects to the PC serial com port. The mini-plug end connects to the IR Thermometer.

Software Installation

The instructions on how to install the optional software are printed on the Software CD label. After reading the label's directions, load the software CD in the PC CD-ROM drive.

Software Use

The instructions for use are provided on the supplied program CD. Refer to the software instruction manual on the CD.

Warranty

FLIR Systems, Inc. warrants this Extech Instruments brand device *to be free of defects in parts and workmanship for* ***one year*** *from date of shipment (a six month limited warranty applies to sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period, contact the Customer Service Department for authorization. Visit the website www.extech.com for contact information. A Return Authorization (RA) number must be issued before any product is returned. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. FLIR Systems, Inc. specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. FLIR's total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.*

Calibration, Repair, and Customer Care Services

FLIR Systems, Inc. offers repair and calibration services for the Extech Instruments products we sell. NIST certification for most products is also provided. Call the Customer Service Department for information on calibration services available for this product. Annual calibrations should be performed to verify meter performance and accuracy. Technical support and general customer service is also provided, refer to the contact information provided below.

Support Lines: U.S. (877) 439-8324; International: +1 (603) 324-7800

Technical Support: Option 3; E-mail: support@extech.com

Repair & Returns: Option 4; E-mail: repair@extech.com

Product specifications are subject to change without notice

Please visit our website for the most up-to-date information

www.extech.com

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